

science has recently been introduced by the appointment of skilled teachers, by the building of laboratories and the establishment of museums, and by the regulations of the commission of public schools as to the time to be allotted to such studies. Among our provincial grammar schools Manchester has provided laboratories and the means of highly skilled scientific instruction. At Burley, also, laboratories have been built, and the head master, Mr. Hough, is distinguished by his scientific knowledge and practical skill. He, doubtless, will diligently employ the means at his command. The Commission on Scientific Instruction has carefully collected the experience of the schools which have introduced practical scientific teaching. They strongly recommend that such instruction should take its place at the side of that which is literary throughout the whole school course. We had practically anticipated this suggestion at Giggleswick. I do not prominently put forward the adaptation of such studies to the wants of the great manufacturing districts of Yorkshire, Lancashire and Cumberland, which are contiguous to us, or of the Durham and Northumberland coalfield. Yet many of the sons of wealthy men in these districts, as well as of those engaged in scientific professions, will complete their education at school. In these trades and professions the practical commencement of a scientific training is often of great value. As I have already said, it forms the scientific habit of mind; it familiarises the youth with the phenomena of the operation of natural laws, and with the manipulation of instruments. It develops the faculty of observation and the power of inductive and deductive reasoning. Moreover the facts of physical science learned in the laboratory are an invaluable possession to the engineer, the chemist, the miner, the physiologist, and to every professional man who has to use these facts, principles, and processes as a part of his daily occupation. This school is intended to offer, in the first place, a sound preparation in elementary knowledge in the English language, its grammar, composition, and some acquaintance with English history and literature. Within the range of its studies are the ancient classical literature and modern languages. It would fail in its purpose if the humble elements of arithmetic were not faithfully cultivated as the basis of mathematical knowledge and scientific calculation. It is on this broad basis that we wish and hope to rear the structure of a sound and scientific culture.

"The questions which the governors of this school have attempted, through years of patient labour, to solve, are also awaiting solution in all similar schools. What are in future to be the relative positions of the literary and scientific education of our youth? How, as in this school, can the financial resources be developed so as to provide laboratories, and a larger skilled staff of teachers, in order to ensure a sound literary culture, together with scientific instruction? Inseparable from these questions is the formidable one, Whence are the skilled teachers of science, capable of giving practical instruction in laboratories to be provided, if science in this sense is to form part of the curriculum of all schools? Where the income of the school is small, that difficulty is at present insurmountable, for a separate science master cannot be afforded in such schools. Nor will it be removed until some means be devised for the training of teachers by which they will be enabled to add practical skill in scientific instruction to a sound basis of literary culture. Then a single master may fulfil the double function in a school. The commission on scientific instruction points to this, among many other reasons, for the establishment, within the universities and elsewhere, of a system of training for masters of schools above the elementary in the art and practice of teaching, and in a practical knowledge of science. The governors of this school of King Edward the Sixth of Giggleswick have not been negligent of the bearing of their labours on these wide general questions. So far as they have proceeded, they are satisfied that a

sound literary culture may not only subsist with practical instruction in science, but that, under earnest and thoughtful guidance, these departments of instruction may each contribute to the intellectual activity and to the success of every form of teaching in the school."

THE INTERNATIONAL GEOGRAPHICAL CONGRESS AND EXHIBITION

THIS Congress, which has been looked forward to with considerable expectation, was opened in the Salle des Etats of the Tuilleries, on Sunday last, in presence of the President of the French Republic, many of the dignitaries of State, foreign ambassadors, and other eminent persons. There was a large attendance of the general public, and addresses were given by the President of the Congress, Admiral de la Roncière le Noury, Baron von Richthofen, Sir Henry Rawlinson, and other delegates of the various nations represented at the Congress.

The regular work of the Congress commenced on Monday, and the sittings will be continued till the 11th inst., when a distribution of medals will take place. We believe a few prizes will be awarded to England, but not many, as our country has contributed but scantily to the exhibition. To-day a visit will be made to the Paris Observatory, and to-morrow one to the Historical Museum of National Antiquities (mostly prehistoric) at St. Germain.

Juries have been appointed to decide on the awards in the various sections of the Exhibition, and a notable feature of these is that not a single Frenchman has been appointed a president; this, we believe, is the result of characteristic delicacy on the part of the French authorities. Col. Montgomerie and Major Wilson are the English representatives.

The Exhibition continues to be well attended, and we hope the receipts will be sufficient to reimburse the Committee, who have become responsible for a large sum, the French Government and Geographical Society having contributed a very small amount.

In the English Section the books of photographs illustrating the people of India and China and the Chinese have proved very attractive. The photographs exhibited in the Russian annex are very numerous, and relate to people of every tribe and condition inhabiting the empire. Austria has also been very successful in this respect, having exhibited photographs and drawings illustrating the chief incidents of the Tegethoff Polar Expedition.

A special room has been set apart for the several Alpine clubs, which have been created in imitation of the English Alpine Club. The publications of the parental association, and the scientific and other apparatus used in Alpine climbing by the English, French, and Italian clubs, are exhibited, and are inspected with evident interest.

The French Government exhibits the results of the missions sent out by the Ministry of Public Instruction. These have been numerous and successful. Independently of the Transit of Venus Expedition, we must mention a series of pictures showing the Bay of Santorin, in the several successive stages of creation of the new volcanic island. These illustrate happily how continents come into existence.

The Hall of National Antiquities (Pre-historic) is a compendium of the Saint Germain Museum, which will be visited by the Congress. A number of highly instructive maps, showing the distribution of relics of the Stone Age, Iron Age, &c., have been published, and are exhibited by the Historical Commission on the Gauls, which was created by Napoleon III, while writing his "Life of Cæsar," and will be continued for a lengthened period.

Amongst the real curiosities of the Exhibition, we must mention a microscopic photograph of the French map by the staff. This photograph was executed by M. Dagron,

the inventor of microscopic photographs for carrier pigeons during the war. The 250 maps, covering a space of more than a hundred yards square, are so reduced on glass, that they can be packed in a portfolio weighing half a pound when full, and examined with a small microscope with perfect facility and clearness.

M. Bouvier, a French naturalist, has presented a collection of almost all the known species of *Algæ* collected in the fish market at Paris.

NOTES

THE following are the officers of the forty-fifth meeting of the British Association which will commence at Bristol on Wednesday, August 25, 1875 :—President-elect—Sir John Hawkshaw, F.R.S. Vice-Presidents-elect—The Right Hon. the Earl of Ducie, F.R.S., the Right Hon. Sir Stafford H. Northcote, Bart., F.R.S., the Mayor of Bristol, Major-General Sir Henry C. Rawlinson, F.R.S., Dr. W. B. Carpenter, F.R.S., W. Sanders, F.R.S. General Secretaries—Capt. Douglas Galton, F.R.S., Dr. Michael Foster, F.R.S. Assistant General Secretary—George Griffith, F.C.S. General Treasurer—Prof. A. W. Williamson, F.R.S. Local Secretaries—W. Lant Carpenter, F.C.S., John H. Clarke. Local Treasurer—Proctor Baker. The sections are the following :—Section A : Mathematical and Physical Science. President—Prof. Balfour Stewart, F.R.S. Section B : Chemical Science. President—A. G. Vernon Harcourt, F.R.S. Section C : Geology. President—Dr. T. Wright, F.R.S.E., F.G.S. Section D : Biology. President—P. L. Sclater, F.R.S. Department of Zoology and Botany, Dr. P. L. Sclater, F.R.S. (President), will preside. Department of Anatomy and Physiology. Prof. Cleland, F.R.S. (Vice-President), will preside. Department of Anthropology. Prof. Rolleston, F.R.S. (Vice-President), will preside. Section E : Geography. President—Major-General Strachey, F.R.S. Section F : Economic Science and Statistics. President—James Heywood, F.R.S., Pres. S. S. Section G : Mechanical Science. President—William Froude, F.R.S. The First General Meeting will be held on Wednesday, August 25, at 8 P.M. when Prof. Tyndall, F.R.S., will resign the chair, and Sir John Hawkshaw, C.E., F.R.S., President-elect, will assume the presidency, and deliver an address. On Thursday evening, August 26, at 8 P.M., a *soirée*; on Friday evening, August 27, at 8.30 P.M., a Discourse by W. Spottiswoode, LL.D., F.R.S., on "The Colours of Polarised Light;" on Monday evening, August 30, at 8.30 P.M., a Discourse by F. J. Bramwell, C.E., F.R.S., on "Railway Safety Appliances;" on Tuesday evening, August 31, at 8 P.M., a *soirée*; on Wednesday, September 1, the Concluding General Meeting will be held at 2.30 P.M. A special lecture to working-men will be given by Dr. Carpenter, F.R.S., on the evening of Saturday, Aug. 28; the subject will be "a piece of limestone." The Local Committee have done everything in their power to make the Bristol meeting a success. All the non-local sectional secretaries will be lodged at the Queen's Hotel, close to the reception-room, at the Local Committee's expense; this will no doubt conduce much to the easy working of the meeting. The experiment of a room for the exhibition of specimens and apparatus, tried first last year at Belfast, will be repeated this year. The President will be the guest of the Mayor, who will occupy for the first time the new Mansion House just given to the city by Thos. Proctor, Esq. Most of the other office-holders, as also all the foreign members, who have intimated their intention of being present, and several English members, have received private invitations from gentlemen resident in Bristol and neighbourhood. Many other hospitable arrangements have, we believe, been made, and altogether, so far as enjoyment and comfort are concerned, this promises to be one of the most satis-

factory meetings of the Association. As we previously intimated, a specially prepared Guide, compiled by several gentlemen, will be published by Wright and Co., of Bristol; a lodging list with useful map will be issued this week. The whole of the Victoria Rooms, Clifton, will be used as a reception-room. All the evening meetings and *soirées* will take place at the Celston Hall, and satisfactory arrangements have been made for the meetings of sections. Several interesting excursions have been arranged for, including two to the Mendips, and handsome offers of entertainment have been made by those gentlemen to whose neighbourhood the excursions are to be made.

A NEW physical observatory is to be erected at Fontenay, the head of which will be M. Janssen. It will be erected on the very spot where it was intended to build one when it was proposed some years back to remove the Paris Observatory. In a few months, then, Paris will have four observatories—the National, the Physical, and two meteorological observatories—one at Montsouris under M. Marie-Davy, and another which is being built at the Acclimatisation Gardens. It is said that some members of the Municipal Council will propose to connect all these observatories with the National one by a special wire to register automatically all the meteorological observations by the Rysselbergh process, which we noticed last week in connection with the Geographical Exhibition.

THE Smithsonian Institute and the Indian Bureau are engaged in forming for the U.S. Centennial, a collection exhibiting the past and present history of the Aboriginal races of America.

"THE German Abyssinian Company."—A company has been incorporated in Berlin which proposes to found at Choa, the most southern province of Abyssinia, a permanent settlement, in order from thence to send out scientific expeditions into the unexplored portion of Africa, and to develop the commerce of the country. The objects of the Company are, however, supposed to be more commercial than scientific.

THE Khedive has issued a decree ordering the enforcement of the metrical system in Egypt from the 1st of January, 1876.

DR. HAWTREY BENSON, of Dublin, writing to the Dublin *Daily Express* under date July 27, describes a remarkable shower of small pieces of hay which he witnessed at Monkstown that morning. It appeared in the form of "a number of dark flocculent bodies floating slowly down through the air from a great height, appearing as if falling from a very heavy dark cloud, which hung over the house." The pieces of hay picked up were wet, "as if a very heavy dew had been deposited on it. The average weight of the larger flocks was probably not more than one or two ounces, and, from that, all sizes were perceptible down to a simple blade. The air was very calm, with a gentle under-current from S.E.; the clouds were moving in an upper-current from S.S.W." The air was tolerably warm and dry, and the phenomenon is thus accounted for by Dr. J. W. Moore : "The coincidence of a hot sun and two air currents probably caused the development of a whirlwind some distance to the south of Monkstown. By it the hay was raised into the air, to fall, as already described, over Monkstown and the adjoining district."

IN the Paris *Bulletin International* for July 30 last Prof. Raulin of Bordeaux gives the result of an examination of a comparison of the gross amount of the rainfall for the ten years 1851-60 with that for the ten years 1861-70, from which it is shown that, as regards the southern half of France, the rainfall during the former of these decennial periods exceeded that of the latter at forty-six out of the fifty-three stations at which observations were made for the twenty years. A similar distribution of the rainfall during these two decennial periods appears to have taken